3D VISUALIZATION OF TURBIDITE RESERVOIR ARCHITECTURES, LOWER CONGO BASIN, OFFSHORE ANGOLA

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Significant oil discoveries in Tertiary turbidite reservoirs occur in an unconfined slope setting in the Lower Congo basin. The architecture of these reservoirs reflects deposition across an above-grade and terraced slope where rates of relative sediment flux exceed local basin subsidence. The nature of the reservoir sequences varies with the paleo-slope topography.Sheet sands occur across terraces or shallow depressions on the slope profile. The terraces and depressions form where the rate of salt-withdrawal is high relative to sediment flux resulting in deposition of relatively thick, sand-rich channelized fans. Once the depression fills these ponded-fans are cut by channels. Straight and low-sinuosity channels form where the sea-floor gradient is high. High degree of flow confinement in deeply incised low-sinuosity channels promote deposition of sandy debris flows and deposition of high net-to-gross reservoir sands. Highly sinuous bypass channels occur across lower gradient steps on the slope equilibrium profile. These channels may occur as solitary elements, but more often form semilinear, partially confined within incised submarine meander belts consisting of amalgamated channel sands, sandy debrites interbedded, and overbank sands and mudstones. With progressive infill of the valley, confined turbidite flows may evolve to unconfined flows resulting in deposition of localized sheet sands.Detailed 3D visualizations and seismic attribute extractions reveal stratal geometries of individual reservior complexes and reveal their depositional history. Detailed, prospect specific observations are combined with regional data to construct conceptual reservoir models. Recent drilling in the Lower Congo Basin have confirmed the applicability of these models and provide important calibration data to further reduce reservoir uncertainty in turbidite complexes.